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THE TWENTY-FOURTH ANNUAL MEETING.

The Kansas Academy of Science met in its twenty-fourth annual session, at Ottawa, on October 14, 15, and 16, 1891.

From the minutes of the Secretary, the following notes are made:

The first evening was devoted to an address by President Robert Hay, on "The Great Plains."

A committee of three, consisting of Prof. F. H. Snow, A. H. Thompson, and D. S. Kelly, was appointed to frame resolutions on the death of Col. N. S. Goss.

The annual election of officers resulted in the choice of the following members for the offices named:

President—E. A. Popenoe.
First Vice President—F. O. Marvin.
Second Vice President—Mrs. N. S. Kedzie.
Secretary—E. H. S. Bailey.
Treasurer—D. S. Kelly.
Librarian—B. B. Smyth.
Curators—A. H. Thompson, B. B. Smyth, L. L. Dyche.

During the meeting, 16 names were proposed for membership.

On Thursday evening, a banquet was tendered the Academy by the Ottawa Science Club and citizens, at the Centennial hotel.

At the different sessions, the following papers, among others, were read.

PRESIDENT'S ADDRESS.

BY ROBERT HAY, JUNCTION CITY.

In some scientific bodies, a custom has grown up for the president of the year to give a summary of the progress of science, or of his own particular branch of science, up to that time. But it is also a custom that the president of any society shall in the address, that is perhaps his most onerous duty, do exactly as he pleases, and talk about whatever he likes.

In the position in which you have been pleased to place me, I shall honor this latter custom fully. I have first to say, then, though I have used the word "onerous" in respect to the duty now to be performed, that also I would use the word "honorable" to describe its relation to myself.

Ladies and gentlemen of the Kansas Academy of Science, I appreciate the honor you have done me. You give me this position as president of your sessions for 1891, and thereby you place me in the same chair that has been occupied by those men who have done most for the advancement of science in Kansas, who have thereby helped forward her fortunes, who have done something for her good name. I will not mention the names of my living predecessors in this honor, but will say that in occupying this position I feel the high dignity of being where was once my honored friend, our old associate and helper, president, and founder, Benjamin F. Mudge.

I will now, in conforming to the custom already mentioned, ask the attention of this audience to some account of the great region west of us. This is the Kansas Academy of Science. It might be called the "Great Plains Academy of Science." From North Dakota to Texas, there is no other society on the great plains that stands for the advancement of natural science. The only exception to this is that just recently a similar society has been born in Nebraska. The father of it is one of our own members, presidents, and founders, John D. Parker.

Recently a scientific man who lives in Texas, but whose reputation is national, expressed to me a strong feeling of envy because I lived in a State where an academy of science was possible.

Kansas, the central State of the American union, is one of the States of the plains. The *plains* comprise all the country from the east front of the Rocky Mountains to the 97th or 96th meridian, and from the Gulf of Mexico and the Rio Grande to beyond the northern boundary of the Dakotas and Montana. We might adopt a more eastern limit, but it is perhaps more convenient to call east of that line the Mississippi valley, though much of it, as here around Ottawa, is 1,000 feet above sea level, and several hundred feet above the waters of the great river. Be it so, then; what mostly we shall talk of to-night will be within the limits mentioned, and any remarks or conclusions that are applicable elsewhere may be so applied according to your own knowledge of localities.

Having for years been intensely interested in investigating the geology of the plains, it has seemed to me strange that this work did not receive as much attention as it might from famous geologists, who have passed over them to explore the geology of the mountains. I do n't think it strange any more; but, while I concede the fascination of the mountain studies, it still remains true that the region of the great plains is interesting in a high degree to every student of the outdoor sciences. Some of the points of interest I shall strive to bring before you, and, by the aid of the lantern, show you something of the scenery—its variety as well as its sameness—of the region of the great plains.

Before using the pictures, I wish to call attention to one or two of the physical features of the plains.

First, though gently rolling or apparently absolutely level for miles, yet there is a steady increment of elevation westward. The elevated land near Manhattan or Fort Riley is 200 to 400 feet above the Kaw river, and is 1,200 to 1,400 feet above sea level. At the State line, 300 miles further west, the elevation of the high prairie is 4,000 feet. At Cheyenne, in Wyoming, it is over 6,000 feet, and 20 miles west the plains abut on the mountains 1,000 feet higher. East and north of Colorado Springs the plains also reach the height of 7,000 feet, and there they do not abut against the mountains, but are cut off by well-defined valleys with a steep eastern escarpment.

Again, there is decrease of altitude of the plains north and south; north from the high lands of northern Nebraska, through the Dakotas, to the sea level of the Arctic ocean; south from the Llano Estacado to the Gulf of Mexico. Eastern Colorado and Wyoming have the highest land of the plains.

The plains are intersected by the greatest rivers of the continent. The Missouri, Yellowstone, Cheyenne, North and South Platte, the Arkansas, the Canadian and the Rio Grande are fed by the melting of the mountain snows, and carry great volumes of water, in shallow or deep, but broad and tortuous channels, across the plains to the sea.

But there are streams which are also large, but not as large as these, whose channels — whose source, course, and outlet — are on the plains; that is, there are mountain rivers and there are rivers of the plains. Into these latter no drop of mountain water is carried. In the region called semiarid they have their birth and take their course. Of these are the Red River of the North and the Red river of Texas, the Little Missouri, the Pecos, the White river of Nebraska, the Medicine river of Kansas, the Republican, Smoky, and Blue, the Running Water, and the Loup. These rivers have cut gashes in the plains and laid bare something of the geological structure. And besides this, they have varied the scenery — they have modified the climate.

Examination of these gashes shows us that the smoothest surface of the plains is caused by a fawn-colored subsoil, which we speak of as the plains marl. This is found on high land, and sometimes in valleys. It extends from the Rio Grande to the Mauvaises Terres of Dakota. It is a lake silt from 2 to 200 feet thick — a fertile soil to its lowest layer. Under this, and also where the plains marl does not cover it, is a formation of limy grit, sometimes white plaster, (the *terra blanca* of New Mexico, the native lime of west Kansas,) sometimes coarse mortar, sometimes a hard conglomerate or loose gravel, with little lime. It holds the water for all the wells of all the plains. None of this class of rivers, from Dakota to southern Texas, have permanent water in them till their channels have cut through this tertiary grit and found a bed on less permeable strata of the old formations.

In Texas there are some other surface deposits, and in the Dakotas the whole region east of the Missouri river has been overlain by a glacial drift, and long lines of boulders, ridges of gravel and shallow lakes testify to the presence of the ancient ice. These lake beds are silted up and are level meadows, and till and loess have made other parts level.

Under the surface formations, in nearly the whole region of the plains, the subjacent rocks are of mesozoic age. On the upper Missouri, at Fort Benton, and stretching down to southern Kansas, they are cretaceous (Laramie to Dakota and Trinity); further south the Trinity, again in the Canadian valley, and the red beds of the trias. Further east, even in Kansas, the surface tertiaries rest on rocks of carboniferous age.

Those who visit the grand cañon of the Colorado, usually learn the immense force of erosion. This lesson may be learned on the plains. All the valleys in which rivers run have been corraded by running water. The White river has cut the plains north of Pine Ridge down a thousand feet, and left the escarpment of that height a wall a hundred miles long. The Red river of Texas comes out of a ravine also a thousand feet deep, carved out of the Llano Estacado — a gash made by the agencies of nature, a wound gnawed by the tooth of time.

This erosion has been done since the surface formations were laid down, in the last tertiary or pleistocene lakes, but many of the valleys are on the lines of depressions made by erosion on the old cretaceous surface, which the later lakes filled up, and which the modern age has since reopened. This is true of the Kaw valley, and notably of those of the Smoky and Republican.

On the other hand, there are old valleys of the ancient premiocene erosion that have been filled up by the later submergences and not reopened. In western Nebraska there are large depressed areas without outlet for their drainage, except some underground percolation through sands and gravels that now fill up old river beds to the level of the highest prairies. In Kansas there are similar areas, the most notable being that which has its eastern terminus in the basin at Scott City, into which merges the valley of the White Woman Creek, 100 miles long. An underground channel probably allows water thence to percolate to the Arkansas, in the neighborhood of Garden City.

The mountains were uplifted after cretaceous beds were laid down in the great sea that covered all that is now western North America. The cretaceous and older strata are, on the flanks of the mountains, turned up on their edges, as at the Garden of the Gods. After this upturn, the tertiary lakes were formed and the surface formations of the plains deposited in them. There has been some uplift since, but the eroding forces have been at work on the plains as well as on the mountains, and some of the forms into which the mountains have been carved have been repeated on the plains. Fantastic carvings of arches, niches and temples are cut in miocene grit or cretaceous chalk. Monument rocks, mounds and promontories are cut by weather in Dakota sandstones, tertiary clays, or triassic red beds, and these forms in secluded valleys, near to or remote from railways, become places of resort; and the bracing air of the prairies, the skies as clear as those of Italy, the sea-like horizon, with the fertility of the prairie soils, all combine to assure us that the great plains shall be the abode of an abundant, healthy and intellectual population, which in the years to come will, perhaps, do some honor to us, as those who strove to implant, with the maize and the wheat, also the seeds of science and a love of truth on the great plains of America.

[Then followed an exhibit of the various kinds of scenery of the plains, from the moraines of North Dakota to the cañons of Texas, by transparencies in the stereopticon illumined by strong electric light, and manipulated by Professor Blake, of the State University.]

THE ORIGIN AND EVOLUTION OF THE HUMAN FACE.

BY A. H. THOMPSON, TOPEKA, KAS.

Of Evolution. It is not necessary at this late day, in the twilight of the nineteenth century, to defend evolution. To the truly scientific mind it has become a great working principle, like gravitation, and is no longer a theory or mere hypothesis, that is open to doubt and criticism. It rests secure upon the very pedestal of nature itself. The book of nature is the record of evolution. Every animal and plant carries in its structure the history of the origin and development of its species. The growth of an individual is an epitome of the evolution of the species. The development of an organ is the history of the origin and evolution of a function, or, indeed, of its decay, as when an organ dwindles to a rudiment from disuse.

Birth, growth, origin, development, genesis, evolution, inception, unfolding, are inseparable from the life history of every species, of every individual, of every organ, of every tissue, of every cell. As the individual has grown, so has the species. The principle of evolution applies to all and explains all. It is the working principle of biology, and to the scientific biologist requires no laudation nor explanation.

Prof. Joseph Le Conte says ("Evolution and Religious Thought") that "Every individual animal body has become what it now is by a gradual process. Commencing as a microscopic spherule of living but apparently unorganized protoplasm, it gradually added cell to cell, tissue to tissue, organ to organ, and function to function; thus becoming more and more complex in the mutual action of its correlated parts, as it passed successively through the stages of germ, egg, embryo, and infant, to maturity. This ascending series of genetically connected stages is called the embryonic or ontogenic series, the genesis of the individual." Again, he says: "Embryonic development is the type of evolution; and evolution is continu-